

**DRAFT LIMITED INVESTIGATION WORK PLAN
COUNTY BRIDGE OVER SAND CREEK
E/W 815 EAST OF BRISTOW
CREEK COUNTY, OKLAHOMA**

Prepared For:

***Oklahoma Department of Transportation
Environmental Programs***

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ACRONYMS AND ABBREVIATIONS

COC	Constituents of Concern
Enviro Clean	Enviro Clean Cardinal, LLC
EPA	United States Environmental Protection Agency
DEQ	Oklahoma Department of Environmental Quality
QA/QC	Quality Assurance/Quality Control
SVOC	Semi Volatile Organic Compound
VOC	Volatile Organic Compound

**LIMITED INVESTIGATION WORK PLAN
COUNTRY BRIDGE OVER SAND CREEK
COUNTY ROAD E/W 815 EAST OF BRISTOW
CREEK COUNTY, OKLAHOMA
DECEMBER 7, 2015**

1.0 INTRODUCTION

Enviro Clean Cardinal LLC, (ECC) under Engineering Contract EC-1548D with Oklahoma Department of Transportation – Environmental Programs (ODOT) has prepared this Work Plan for a limited investigation of certain borrow soils used in the modification of a County Bridge over Sand Creek, located on E/W 815, approximately one half mile east of the City of Bristow (Site). Pursuant to state statute, ODOT is charged with the administration of the County Improvements for Roads and Bridges (CIRB) Program. The modifications to Creek County's County Bridge of Sand Creek on E/W 815 is part of the CIRB Program. This Work Plan is for a limited environmental investigation of borrow soils received from a local source recently identified to be within the boundaries of a United States Environmental Protection Agency (EPA) Superfund Site referred to as the Wilcox Refinery Superfund Site. The project Site location and topographic features are shown on **Figure 1**.

1.1 BACKGROUND

The following information was obtained through a Site visit and an informal interview with a representative of the construction contractor and two representatives of the firm contracted to perform construction inspections.

The borrow soils which are the subject of this limited investigation were utilized in earthwork construction associated with the bridge and originated from a borrow source area located approximately 0.3 miles to the north of the Site. On or about October 5, 2015, the bridge contractor started importing soils from the borrow source area. Records maintained by the construction inspector purportedly indicate that 32 loads of such borrow soils were delivered to the Site. Each load was estimated to be 18 cubic yards in volume, for a total estimated volume of 576 cubic yards.

In the latter part of October 2015, the EPA and the Oklahoma Department of Environmental Quality (DEQ) contacted ODOT's Environmental Programs Division to inform it that borrow soils uses at the Site were being obtained by the bridge contractor from the Wilcox Refinery Superfund Site, and that testing may be needed to determine if such borrow soils contained chemicals of concern (COC) associated with the Wilcox Refinery Superfund Site.

Based upon the investigation to date, the subject estimated 576 cubic yards of borrow soils were placed in the following locations on the Site:

1. in and around the bridge approaches,
2. adjacent to the abutment on the west side of Sand Creek along the southern edge of the road, and
3. in two residential driveway tie-ins on the eastern side of the bridge.

The borrow soils placed adjacent to the west bridge abutment are reported to range in thickness from approximately zero at the base of the slope to approximately eight feet at the top of the slope. The thickness of the borrow soils elsewhere purportedly ranges from near zero to approximately 2.0 ft.

The lateral extent of the borrow soils is generally indicated by differences in coloration between the borrow soils and those soils that were native to the immediate vicinity of the bridge and by the limits of construction. The borrow soils placed around the abutment have been covered with large (approximately 24 inch) riprap and the underlying filter blanket.

2.0 TASK NARRATIVE

This section of the Work Plan includes a summary of the methodology for collecting and analyzing soil samples to determine if soils from the borrow source area on the Wilcox Refinery Superfund Site used by the contractor during the construction of the bridge contain COCs potentially associated with the Wilcox Refinery Superfund Site and if so, to determine the concentrations of those COCs within the soil samples.

The potential presence and distribution of refinery related COCs in the borrow soil at issue at the Site and immediately surrounding soils will be evaluated. Representative samples will be collected and submitted to TestAmerica (Nashville, Tennessee).

2.1 SOILS

To determine the potential presence and distribution of COCs within the soils placed around the constructed bridge structure and roadway approaches, samples will be collected across the Site at a rate of one sample per 2,500 square feet (ft²) area (maximum). Using a grid pattern to be finally established in the field, “sample cells” will be established along each side of the centerline of the newly constructed portions of county road E/W 815.

West of the bridge, sample cells will be established beginning at approximately station 10+40, as shown on the construction drawings, and will include the driveway apron in the southwest portion of the Site. The cell grid will continue on both sides of the centerline of the road eastward to a point at or east of the bridge abutment at station 13+70. It is estimated there will be 14 sample cells on the west side of Sand Creek.

Sample cells will be established on the east side of Sand Creek starting east of the bridge abutment at approximate station 15+07 and continue on both sides of the centerline of the road to a point 150 ft east and will include the driveway tie ins around station 16+37. It is estimated there will be six sample cells on the east side of Sand Creek.

A total of 20 “**sample cell**” areas, each having a total area not exceeding 2,500 ft², are proposed for sample collection. Each of the sample locations will be located in the field using a hand held GPS unit loaded with an aerial photograph depicting the 50 ft x 50 ft grid, as shown on **Figure 2**.

Each sample cell will be divided into four quadrants approximately equal in area, producing northwest, northeast, southwest and southeast quadrants. A grab sample will be collected from the soil surface to a depth of 0.5 ft, using a decontaminated hand-auger, in the approximate center of each cell quadrant (four samples). The soils from each quadrant will be placed into a stainless steel bowl and blended thoroughly to form a composite sample representative of the sample cell.

Samples will be submitted for laboratory analysis according to the “Skinner List” parameters listed on **Table 1**. For EPA method 8270D Semi-volatile Organic Compounds, method 8270D SIM Polycyclic aromatic hydrocarbons (PAH), and methods 6020A, /7470/7471, 9014/9012 for metals, an aliquot of the composite soil sample will be collected from the mixing bowl and placed directly into the laboratory-prepared sample containers. For volatiles analysis, a fifth soil sample will be collected from the approximate center of the sample cell. This portion of the sample will be a non-composite, discrete grab sample collected using field preservation Method 5035 and submitted for VOC analysis according to EPA method 8260C.

In one of the sample cell quadrants near station 13+70 a single boring will be advanced to the apparent soil interface between the native in place soils and the imported borrow soils. A single, non-composite, sample will be collected from this boring from the approximate depth interval of 5 to 6 feet below grade, or just above the soil interface. This sample will be submitted for the same Skinner List parameters.

The laboratory provided sample containers will be sealed, labeled as to source and content, packed on ice for preservation, and placed under chain-of-custody control for transport to the analytical laboratory (TestAmerica Laboratory, Nashville, TN).

2.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality Assurance/Quality Control (QA/QC) samples including equipment rinsate, duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected. Equipment rinsate samples will be collected daily during the use of sampling equipment which contacts sample material. Duplicate samples will be collected at a minimum frequency of 10%, and MS/MSD samples will be collected at a minimum frequency of 5%, or one sample for every 20 samples collected.

3.0 REFERENCES

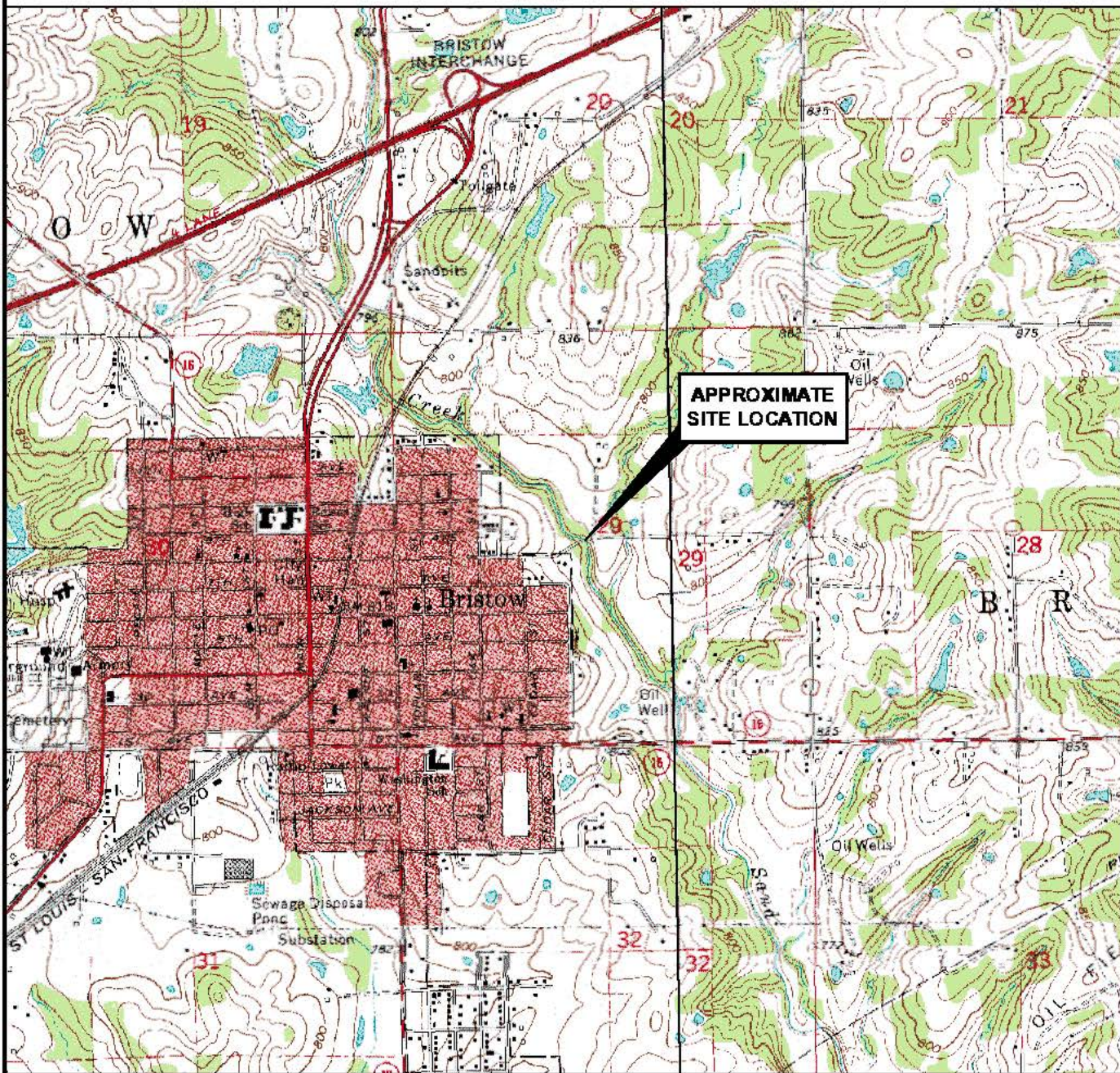
E-mail October 27, 2015 from DEQ to ODOT, Regarding Bridge Project in Creek County.

Expanded Site Inspection Report, Wilcox Oil Company, Bristow, Creek County, OK, Weston, March 1997.

State of Oklahoma, Department of Transportation, Plan of Proposed County Bridge, Creek County, State Job No. 29217(04).

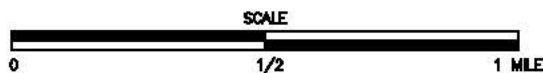
FIGURES

R 9 E

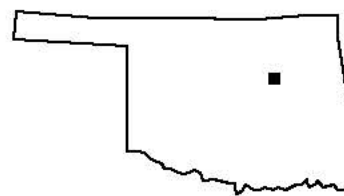


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SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLES
BRISTOW, OKLAHOMA 1973 AND
SLICK, OKLAHOMA 1973



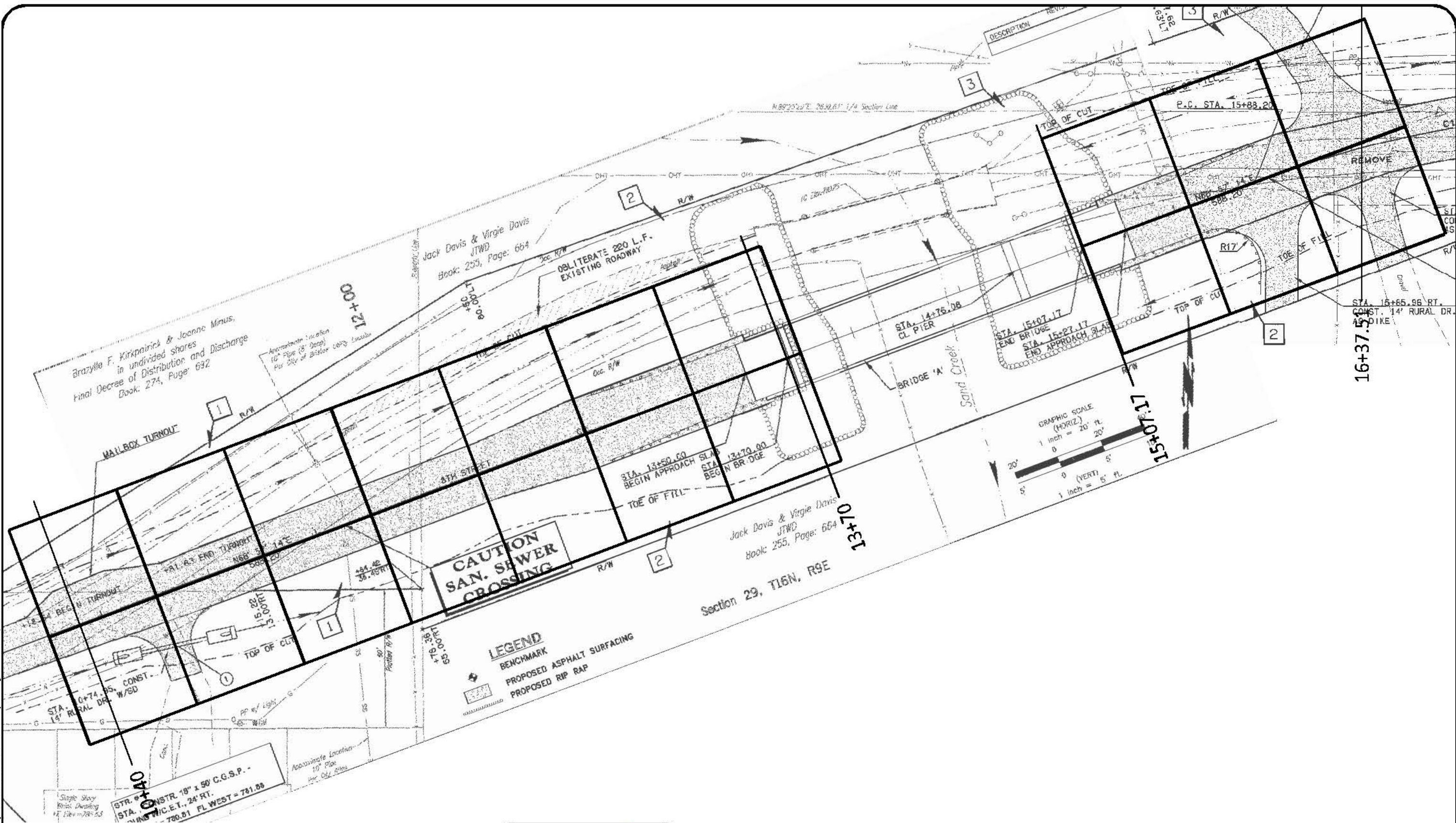
OKLAHOMA



CLIENT	ODOT	FIGURE TITLE	SITE LOCATION AND TOPOGRAPHIC FEATURES			
LOCATION	COUNTY BRIDGE OVER SAND CREEK E&W 815 OF BRISTOW, CREEK CO., OKLAHOMA	DOCUMENT TITLE	SAMPLING WORK PLAN			
 <div>Enviro Clean Cardinal, LLC</div> <div>7060 South Yale Avenue, Suite 603 Tulsa, Oklahoma 74136 918.794.7828</div> <div>www.EnviroCleanPS.com</div>				DESIGNED BY	DB	
		DATE	11/5/2015	APPROVED BY	DB	
		SCALE	AS SHOWN	DRAWN BY	SKG	
		PROJECT NUMBER		FIGURE NUMBER		
		ODOT		1		

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DOCUMENT TITLE SAMPLING WORK PLAN				FIGURE TITLE SITE LOCATION WITH SAMPLE GRID LOCATIONS				
CLIENT ODOT						PROJECT NUMBER	FIGURE NUMBER	
		DESIGNED BY		DB				
		APPROVED BY		DB	SCALE			1" = 40'
LOCATION COUNTY BRIDGE OVER SAND CREEK E/W 815 OF BRISTOW, CREEK CO., OKLAHOMA		DRAWN BY		SKG	DATE	11/15/2015	ODOT	2

TABLES

**Table 1 : Skinner List of Analytical Parameters
County Bridge Over Sand Creek
Creek County, Oklahoma**

Chemicals of Concern	Method
Inorganics	
Antimony	6020A
Arsenic	6020A
Barium	6020A
Beryllium	6020A
Cadmium	6020A
Chromium, total	6020A
Cobalt	6020A
Cyanide	9014/9012
Lead	6020A
Mercury	7470/7471
Nickel	6020A
Selenium	6020A
Silver	6020A
Vanadium	6020A
Zinc	6020A
Volatile Organics	
Benzene	8260C
Carbon disulfide	8260C
Chlorobenzene	8260C
Chloroform	8260C
1,2-Dichloroethane	8260C
1,1-Dichloroethane	8260C
1,4-Dioxane	8260C
Ethylbenzene	8260C
Ethylene dibromide (EDB or 1,2-Dibromoethane)	8260C
Methyl ethyl ketone (MEK)	8260C
Methyl tertiary butyl ether (MTBE)	8260C
Styrene	8260C
Toluene	8260C
1,1,1-Trichloroethane	8260C
Trichloroethene	8260C
Tetrachloroethylene	8260C
Xylenes (total)	8260C

**Table 1 : Skinner List of Analytical Parameters
County Bridge Over Sand Creek
Creek County, Oklahoma**

Chemicals of Concern	Method
Semi-volatile Organics	
Acenaphthene	8270D SIM
Anthracene	8270D SIM
Benzo(a)anthracene	8270D SIM
Benzo(b)fluoranthene	8270D SIM
Benzo(k)fluoranthene	8270D SIM
Benzo(a)pyrene	8270D SIM
Bis(2-ethylhexyl) phthalate	8270D
Chrysene	8270D SIM
o-Cresol	8270D
m & p-Cresol	8270D
Dibenz(a,h)anthracene	8270D SIM
Di-n-butyl phthalate	8270D
1,2-Dichlorobenzene*	8270D
1,3-Dichlorobenzene*	8270D
1,4-Dichlorobenzene*	8270D
Diethyl phthalate	8270D
2,4 Dimethylphenol	8270D
Dimethyl phthalate	8270D
2,4 Dinitrophenol	8270D
Fluoranthene	8270D SIM
Fluorene	8270D SIM
Indeno(1,2,3-cd)pyrene	8270D SIM
Naphthalene	8270D SIM
4-Nitrophenol	8270D
Phenanthrene	8270D SIM
Phenol	8270D
Pyrene	8270D SIM
Pyridine	8270D
Quinoline	8270D

Notes:

* These compounds are listed with the semi-volatiles on the Skinner list. However, they are also reported with the volatiles method (SW-846 8260C).